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ABSTRACT

This report presents the results of a study undertaken to test the possibility that pre-existing attitudes could explain the previously reported association between fitness improvement and attitudes and self-confidence. Recruits from four Marine Corps basic training platoons (n=265) provided data for the study. Scores on the standard physical fitness tests showed that one platoon had substantially above average fitness improvement and another substantially below average improvement. A comparison of these two platoons on attitude and self-esteem measures showed that the high improvement platoon had more positive attitudes toward the Marine Corps and higher self-esteem. The attitudes included greater acceptance of the need for authority and discipline, greater identification with the Marine Corps, higher commitment to achieving and maintaining high levels of performance, and greater satisfaction with the Marine Corps. (JD)

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SIDE EFFECTS OF PHYSICAL TRAINING IN MARINE CORPS BASIC TRAINING: A REPLICATION AND EXTENSION*

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SUMMARY

Physical training (PT) is part of Marine Corps basic training (BT) because recruits must prepare for the physical rigors of the Fleet Marine Force (FMF). A prior study showed that PT may also develop esprit de corps and self-confidence in recruits. Recruits from platoons with above average fitness improvement during BT had more positive attitudes toward the Marine Corps and a greater sense of self-improvement at the end of BT. However, the design of that study left open the possibility that attitudes caused fitness improvement rather than the reverse. This report presents the results of a study undertaken to replicate the prior findings and to test the possibility that pre-existing attitudes could explain the previously reported association between fitness improvement and attitudes and self-confidence.

Recruits from four BT platoons (n = 265) provided data for the study. Scores on the standard physical fitness tests (PFTs) routinely administered in BT showed that one platoon had substantially above average fitness improvement and another substantially below average improvement. Comparing these two platoons on attitude and self-esteem measures taken at the end of BT, the high improvement platoon had more positive attitudes toward the Marine Corps and higher self-esteem. The attitudes included greater acceptance of the need for authority and discipline, greater identification with the Marine Corps, higher commitment to achieving and maintaining high levels of performance, and greater general satisfaction with the Marine Corps. The high improvement platoon also performed better on academic tests at the end of BT, thus confirming another prior finding. Follow-up analyses showed that the attitude differences between the above and below average fitness improvement platoons could not be explained by differences in academic performance.

The cumulative evidence from this series of studies has shown that recruits from platoons which achieve above average improvement in fitness during BT consistently have more positive attitudes toward the Marine Corps and greater self-confidence at the end of BT. These reliable differences cannot be explained by pre-existing attitudes, leadership, or non-fitness aspects of BT performance. Therefore, there is a reasonable basis for asserting that PT promotes esprit de corps and self-esteem in Marine Corps BT. The initial study also showed that these outcomes are achieved without significant increases in attrition or illness during training. Whether similar positive effects occur in other settings and populations remains to be determined.

INTRODUCTION

Physical training (PT) in Marine Corps basic training (BT) prepares recruits for the physical rigors of the Fleet Marine Force (FMF), but PT may also promote esprit de corps and self-confidence in recruits (1). These effects would mean that PT contributes to the achievement of other BT goals in addition to improving fitness (2). These additional PT correlates have been labelled side effects to distinguish them from the primary PT outcome of improved fitness (1). This label is appropriate if PT causes attitude changes, but the prior evidence demonstrating these associations was correlational. Therefore, positive attitudes may cause fitness improvement rather than the reverse. For example, positive attitudes at the beginning of training imply higher motivation and greater effort in training which could cause above average fitness improvement. The present study used a longitudinal design to replicate the prior findings and to determine whether initial attitudes and self-confidence could explain the previously reported effects.

METHOD

Sample

Study participants (n = 265) were male Marine Corps recruits who volunteered after being given a complete description of the study. The average recruit was 19.6 (S.D. = 1.58) years old, had 11.9 (S.D. = .69) years of schooling, and a General Classification Test score of 102.1 (S.D. = 15.12). The primary race categories were White (82%), Black (12%), and Hispanic-American (4%).

Attitude Measures

Attitude scales provided an assessment of esprit de corps, a non-fitness outcome which Marine Corps BT attempts to develop in recruits (3). The scales measuring esprit de corps included assessments of identification with the Marine Corps (Affiliation, 5-item scale), acceptance of orders and discipline (Authority, 5-item scale), commitment to achieving and maintaining high levels of performance in the Marine Corps (Commitment, 4-item scale), and general satisfaction with the Marine Corps (Satisfaction, 3-item scale). The items for each of the scales are given in Appendix A. Each attitude measure employed a 7-point response format ranging from "Strongly Disagree" to "Strongly Agree." These attitudes were measured 4 days prior to the beginning of BT, 2 days after the first physical fitness test (PFT) (see below), and the day prior to graduation from BT.

Self-Esteem

The effects of PT on recruits' self-confidence was assessed by relating fitness improvement to Bachman's (4) 10-item modification of Rosenberg's (5) self-esteem scale (see Appendix A for items). The response format was the same as that for the attitude measures; measurements were made at the times indicated above for attitudes toward the Marine Corps.

Leadership Characteristics

The initial study showed that recruits in high improvement platoons had more positive perceptions of leaders as examples of what a Marine should be (Referent Power), but did not view leaders as providing more structure and guidance for tasks (Leader Structure), being more supportive and showing more appreciation for recruits' efforts (Leader Support), or as being more expert at their jobs (Expert Power). Although the previous study produced no clear overall trend toward better or worse leadership perceptions in the high improvement platoons, multi-item Likert scales for these measures were included to further explore possible leadership differences. The response format used for the attitude and self-esteem measures was also used for these scales, each of which consisted of four or five items (Appendix A).

BT Performance

Standard Marine Corps tests provided measures of knowledge and skill acquisition during BT. Scores on academic tests administered after the first 2-1/2 weeks of BT and again in the last 2 weeks of BT assessed knowledge acquisition. The first test provided one overall score; the second test provided separate scores for oral and written portions of the examination. Rifle marksmanship scores were the results of firing the M-16 rifle for qualification during the fifth week of BT.

Physical Fitness

The PFT routinely administered during BT was used to assess fitness in this study. This test consisted of pull-ups, sit-ups, and a 3-mile run. Scores for each component could range from 0 to 100; overall fitness was represented by the sum of the individual scores. The PFT was administered after the first 2 weeks of

BT (PFT1) and shortly before graduation (PFT2). As in the previous study, the overall score from each administration was used to assess physical fitness change during BT.

Analysis Procedures

Analysis of covariance (ANCOVA) with platoon as the group classification, PFT2 as the dependent variable, and PFT1 as the covariate, tested for overall platoon differences in fitness improvement. The modified least significant differences test (6) provided a follow-up analysis to identify significant differences between particular platoons. A full description of the analysis procedures, including checks for factors that might have invalidated the covariance procedure, has been given by Vickers (1).

To replicate the previous study (1), the comparisons for the high and low improvement platoons began with simple t-tests to determine whether there were significant differences in attitudes, self-esteem, leadership perceptions measured at the end of BT, and performance during BT. Additional ANCOVA procedures then tested the significance of the attitude differences at the end of BT controlling for prior attitudes and academic performance. The assumption of parallel regression lines was met in each ANCOVA.

RESULTS

Platoon Fitness Comparison

ANCOVA with PFT1 as the covariate and PFT2 as the dependent variable showed significant platoon differences in fitness improvement ($F_{3,261} = 8.66$, $p < .001$). Post hoc comparisons showed that the two extreme platoons differed significantly ($p < .01$) in fitness improvement. These two platoons therefore were classified as the high and low fitness improvement groups for subsequent analyses. Adjusted PFT2 fitness scores, taking PFT1 into account, were 258.8 for the high improvement platoon and 241.2 for the low improvement platoon.

Comparisons at the End of BT

Each of the four attitudes was more positive in the high improvement platoon. However, as in the previous study (1), not all of the differences achieved statistical significance. In this instance, only the Commitment difference was significant.

Although the attitude differences have been modest in each sample of recruits studied to date, the high improvement platoons have had more positive attitudes for every comparison made. As a result, the method of adding probabilities (7) was used to estimate the combined significance of the trends pooled across samples. This test showed significant differences ranging from $p < .045$ for Affiliation to $p < .003$ for Commitment. Thus, there are modest, but consistent and cumulatively significant, differences favoring the high improvement platoon for each attitude studied.

The recruits in the high improvement platoon also reported higher average self-esteem at the end of BT (Table 1). A pooled probability estimate could not be computed for this variable because the Bachman (4) scale had not been employed previously.

TABLE 1
ATTITUDE AND SELF-ESTEEM COMPARISONS
FOR HIGH VERSUS LOW FITNESS IMPROVEMENT PLATOONS

	FINAL ATTITUDE SCORES:					DIFFERENCES ADJUSTING FOR: INITIAL SCORES			SCORES AFTER PFT1		
ATTITUDE	HIGH	LOW	DIFF.[a]	t	SIG.	DIFF.[a]	t	SIG.	DIFF.[a]	t	SIG.
Satisfaction	5.35	5.17	.18	.65	.260	.42	1.85	.033	.61	2.54	.006
Commitment	6.88	6.67	.21	2.46	.008	.23	2.81	.003	.23	2.74	.004
Affiliation	4.66	4.42	.24	.86	.195	.43	1.86	.033	.55	2.37	.010
Authority	6.25	6.11	.14	.96	.170	.14	1.06	.145	.32	2.41	.009
Self-Esteem	6.61	6.38	.23	2.18	.016	.28	3.24	.001	.33	3.67	.001

[a]DIFF. = Difference between group means.

NOTE: Degrees of freedom for the *t*-tests ranged from 132 to 138. The *t* values and significance levels were established using separate variance estimates for all comparisons.

The previous finding that leaders of high improvement platoons were perceived as better qualified and better examples of what a Marine should be than leaders of low improvement platoons did not replicate (High = 5.69, Low = 5.84, $t = -0.73$, $p < .469$). Further analysis indicated that the pooled probability was nonsignificant ($p > .056$) for each of the four leadership scales.

The performance findings also replicated prior differences between the high and low improvement platoons. The high improvement platoon did better on the final oral examination (High = 48.8 vs. Low = 45.9, $t = 7.59$, $p < .001$) and the

final written examination (High = 48.3 vs. Low = 47.1, t = 3.86, p < .001). Combining these findings with those in the earlier study, the pooled significance level for the oral portion of the final examination was p < .001 while that for the written portion was p < .022. As in the prior study, the high and low improvement groups did not differ on the initial academic examination or M-16 qualification scores.

Influence of Initial Attitudes and Self-Esteem

The next series of analyses examined the influence of initial attitudes and self-esteem on the differences observed at the end of BT. Comparison of the high and low improvement platoons on measures obtained prior to BT showed that recruits in the two platoons had similar attitudes except for a trend toward lower satisfaction in the high improvement platoon (High = 4.56, Low = 5.06, t = -1.86, p < .064, 2-tailed). A similar comparison for attitudes measured following PFT1 showed that the high improvement platoon scored lower on each scale. The differences were significant for acceptance of authority (High = 5.74, Low = 6.09, t = -2.51, p < .013) and satisfaction (High = 4.46, Low = 5.20, t = -2.79, p < .006). These early attitude differences could not be attributed to differences in physical fitness because the two platoons had virtually identical average scores on PFT1 (High = 210.2, Low = 211.4, t = -0.16, p < .873).

The relatively negative attitudes in the high improvement platoon early in training were one reason that the attitude differences at the end of training were generally nonsignificant. ANCOVA to adjust for these earlier differences, indicated that the attitude differences at the end of training would have been more substantial if the high improvement platoon had not had to make up for initially negative attitudes (Table 1).

The strongest case that can be made for the effects of fitness improvement on attitudes is provided by considering the actual pattern of attitude scores for the two platoons. As indicated above, the high improvement platoon had less positive attitudes following PFT1, but more positive attitudes when the fitness improvements had taken place. This reversal occurred because attitudes in the low improvement platoon changed very little after PFT1 while the high improvement platoon showed substantial attitude gains.

A final series of analyses considered the possibility that the academic performance differences associated with fitness improvement were the causes of the final attitude differences. These analyses employed the scores for the final oral

and written examinations as covariates when comparing the high and low improvement platoons on final attitudes. This procedure did not change the findings.

DISCUSSION

The results confirmed the association between above average platoon fitness improvement and better attitudes, greater feelings of self-esteem, and better academic performance at the end of BT. The cumulative evidence from three samples of recruits now indicates that these differences cannot be explained by pre-existing attitudes, leadership differences, or differences in other aspects of performance. Ruling out these plausible alternative explanations provides a stronger basis for concluding that PT causes positive side effects in high fitness improvement platoons. Thus, PT promotes the Marine Corps BT objectives of developing esprit de corps and self-esteem imparting basic military skills and knowledge to recruits in addition to serving its primary role of improving fitness.

Evidence from the earlier study (1) indicated that the PT side effects described above represent a net positive outcome. That study showed that high improvement platoons did not differ from low improvement platoons on measures of illness and injury during BT and did not have a significantly higher attrition rate. However, further investigation of the relationship between platoon fitness improvement and platoon attrition rate would be worthwhile because there was a trend toward higher attrition in the high improvement platoons.

These findings may lead to consideration of PT programs as means of enhancing morale and performance in other military settings. PT programs will be appropriate for these purposes if results obtained in BT generalize to other settings. The self-esteem findings can be expected to generalize because similar effects have already been demonstrated outside the BT setting (8).

Whether the effects of PT on attitudes toward an organization will generalize to other settings is less certain, because these effects apparently have not been studied previously. However, there is other evidence that a demanding initiation produces positive attitudes toward the organization joined (9-11). Thus, PT is likely to produce positive attitudes toward the organization whenever it is part of an initiation process (e.g., other BT settings, special forces training).

A limitation of the preceding conclusion is that it refers only to special training situations. Additional study is needed to determine whether the positive PT side effects reported in this series of studies occur in other settings.

Studies directed toward this end must be sensitive to elements of the BT PT program which may have influenced the findings reported here, including exercising as a group, graded increases in exercise intensity over time, tests evaluating improvement at regular intervals, and so on. The psychological processes linking PT to positive side effects also should be studied. Understanding these processes may be critical for predicting when PT will have positive side effects and for designing PT programs which maximize these side effects. Investigations directed toward these ends have the potential to produce general tools for promoting self-confidence, morale, and performance in a wide range of organizational settings.

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APPENDIX A

ITEM CONTENT FOR SCALES

Appendix A

ITEM CONTENT FOR SCALES

ATTITUDE SCALES

Affiliation

1. I feel that my outlook is really more that of a civilian than a Marine. (R)
2. If my commanding officer offered me an honorable discharge right now, I would not take it.
3. If things work out for me in the Marine Corps, I will probably reenlist.
4. If I had my choice now, I would prefer to be a civilian. (R)
5. Despite everything, I feel more at home in civilian life. (R)

Authority

1. The discipline you get in the Marine Corps is good for you.
2. A Marine should not be allowed to talk back to his superiors.
3. The most important thing to teach Marines is absolute obedience to their superiors.
4. In general, I think the Marine Corps is pretty well run.
5. There is a good reason for almost every Marine Corps rule and regulation.

Commitment

1. It is important to me personally to have a good record in the Marines.
2. I don't care how well I do in the Marines. (R)
3. Doing a good job in the Marine Corps gives me a feeling of satisfaction.
4. I consider it an honor to be a Marine.

Satisfaction

1. All in all, I am very satisfied with being a Marine.
2. If a good friend of mine said he was interested in joining the Marines, I would strongly recommend it.
3. Knowing what I do now, if I had to decide all over again whether to enlist, I definitely would not. (R)

SELF-ESTEEM

1. I feel that I'm a person of worth, at least on an equal plane with others.
2. I feel that I have a number of good qualities.
3. I am able to do things as well as most other people.
4. I feel I do not have much to be proud of. (R)
5. I take a positive attitude toward myself.
6. Sometimes I think I am no good at all. (R)
7. I am a useful guy to have around.
8. I feel that I can't do anything right. (R)
9. When I do a job, I do it well.
10. I feel that my life is not very useful. (R)

LEADERSHIP VARIABLES

Leader Structure

1. Our Drill Instructors tell us exactly how to do things.
2. The Drill Instructors let us know exactly what is expected of us.
3. Our Drill Instructors keep the platoon well informed.
4. The Drill Instructors explain in detail what to do.
5. Drill Instructors tell us why things have to be done.

Leader Support

1. Drill Instructors listen to recruits' problems when a difficulty arises.
2. The Drill Instructors are interested in our welfare.
3. The Drill Instructors are proud of the platoon.
4. Drill Instructors care about the platoon and the recruits in it.

Expert Power

1. My Drill Instructors are well-qualified for their jobs.
2. My Drill Instructors are very skilled Marines.
3. My Drill Instructors are very experienced Marines.
4. My Drill Instructors really know their stuff.
5. My Drill Instructors are very good at what they do.

Referent Power

1. I would like to be like my Drill Instructors.
2. I admire my Drill Instructors.
3. I respect my Drill Instructors as people.
4. My Drill Instructors are good examples of what Marines should be.

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A prior study showed that Marine Corps basic training platoons with above average fitness improvement had better attitudes and performance at the end of training than platoons with below average improvement. This study replicated these findings and showed that pre-existing attitudes could not explain these differences. There is now a better basis for asserting that rigorous PT promotes Esprit de Corps and self-confidence in Marine Corps basic training. Additional research is needed to determine whether similar effects would occur in other settings and populations.

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